

ABSTRACT OF THE DISCLOSURE

The subject invention relates to isolated nucleic acid sequences or genes involved in polyketide synthase (PKS) biosynthetic pathways. In particular, such pathways are involved in the production of polyunsaturated fatty acids (PUFAs) such as, for example, Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA). Specifically, the invention relates to isolating nucleic acid sequences encoding proteins involved in eukaryotic PUFA-PKS systems and to uses of these genes and encoded proteins in PUFA-PKS systems, in heterologous hosts, for the production of PUFAs such as EPA and DHA.